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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/769,902	02/03/2004	Donald H. Stedman	23439-099-401	9183

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EXAMINER
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BARAN, MARY C

ART UNIT	PAPER NUMBER
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2857

DATE MAILED: 01/03/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/769,902

Applicant(s)

STEDMAN ET AL.

Examiner

Mary Kate B Baran

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 03 December 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 21 and 23-32 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 21, 24-27, 29 and 31 is/are rejected.
- 7) ☒ Claim(s) 23, 28, 30 and 32 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Response to Amendment***

1. This action is responsive to the amendments filed 03 December 2004. Claims 21 and 23-32 are pending. Claims 21 and 23 have been amended. Claim 22 has been cancelled.

### ***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 21, 24 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dec (U.S. Patent No. 6,025,920) in view of Jack et al. (U.S. Patent No. 5,831,267) (hereinafter Jack).

Referring to claim 21, Dec discloses a system for measuring an opacity value for an exhaust emission plume (see Dec, column 4 lines 29-32), a source of electromagnetic radiation (see Dec, Fig. 1, light source 110) that is directed through an exhaust emission plume (see Dec, Fig. 1, exhaust plume 145), a detector that detects the electromagnetic radiation (see Dec, Fig. 1, detector) and outputs a detector signal proportional to the detected electromagnetic radiation (see Dec, column 4 lines 29-32), and a processor that receives the detector signal and calculates an opacity value for the exhaust plume based, at least in part, upon the detector signal (see Dec, column 4 lines

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29-32), but does not teach one or more sources which emit electromagnetic radiation in a first wavelength region, a second wavelength region, and a third wavelength region.

Jack discloses one or more sources which emit electromagnetic radiation in a first wavelength region, a second wavelength region, and a third wavelength region (see Jack et al., column 4 lines 10-17). Jack explains that the electromagnetic radiation emitted has a plurality of predetermined wavelengths (see Jack, Abstract), which are used to identify multiple pollutants found within the exhaust plume (see Jack, column 4 lines 48-64).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Dec to include the teachings of Jack because detection of multiple wavelengths allows the skilled artisan to determine multiple constituents within an emission plume (see Jack, column 4 lines 10-17).

Referring to claim 24, Dec teaches all the features of the claimed invention except that the detector is enabled to detect electromagnetic radiation in each of the first, second and third wavelength regions and outputs a signal proportional to a detected intensity at each of the first, second, and third wavelength regions, and a comparison module that compares the intensity of each of the first, second, and third wavelength regions.

Jack discloses that the detector is enabled to detect electromagnetic radiation in each of the first, second and third wavelength regions and outputs a signal proportional to a detected intensity at each of the first, second, and third wavelength regions (see

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Jack, column 5 lines 63-67), and a comparison module that compares the intensity of each of the first, second, and third wavelength regions (see Jack, column 6 lines 18-23).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Dec to include the teachings of Jack because detection and comparison of multiple wavelengths allows the skilled artisan to determine multiple constituents within an emission (see Jack, column 4 lines 10-17).

Referring to claim 25, Dec teaches a processor which determines the opacity value proportional to the change in intensity for the detected intensity of a wavelength (see Dec, column 4 lines 1-6), but does not teach a first, second, and third wavelength regions.

Jack teaches a first, second, and third wavelength regions (see Jack et al., column 3 lines 1-3).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Dec to include the teachings of Jack because detection and comparison of multiple wavelengths allows the skilled artisan to determine the intensity of a specific constituent within an emission plume (see Jack, column 4 line 65 – column 5 line 11).

3. Claims 26, 27, 29 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dec (U.S. Patent No. 6,025,920) and Jack et al. (U.S. Patent No.

5,831,267) (hereinafter Jack) in view of Schiefer et al. (U.S. Patent No. 6,570,655) (hereinafter Schiefer).

Referring to claims 26 and 29, Dec discloses determining an opacity value for an exhaust emission plume (see Dec, column 4 lines 1-6), directing a beam of substantially monochromatic electromagnetic radiation substantially through the spatial volume of an exhaust emission plume (see Dec, column 3 lines 43-47). Dec does not teach obtaining a measurement of an exhaust constituent amount in a spatial volume of an exhaust emission plume, measuring a transmittance of the beam of substantially monochromatic electromagnetic radiation, or calculating an opacity value proportional to the relation  $K_s = \ln(1/T)/n$ .

Jack teaches obtaining a measurement of an exhaust constituent amount in an exhaust emission plume (see Jack, column 6 lines 18-23), and measuring a transmittance of the beam of electromagnetic radiation (see Jack, column 4 lines 10-17), the examiner interprets the term "absorption" (see Jack, column 4 line 13) to mean the same as the claimed term "transmittance" (see page 2 lines 19-20).

Schiefer teaches calculating an opacity value proportional to the relation  $K_s = \ln(1/T)/n$  (see Schiefer, column 7 lines 55-57). The Examiner notes that the claimed equation is a derivation of Beer's Law, which can be used to compute the opacity, as disclosed in Schiefer.

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify Dec to include the teachings of Jack because measuring the absorption can be used to determine the constituent (see Jack, column 4 lines 15-17)

and to further include the teachings of Schiefer because Beer's Law permits the skilled artisan to determine the opacity of the individual constituents.

Referring to claims 27 and 31, Dec and Schiefer teach all the features of the claimed invention except an exhaust constituent amount which comprises a measurement of an amount of carbon dioxide.

Jack further discloses an exhaust constituent amount which comprises a measurement of an amount of carbon dioxide (see Jack, column 6 lines 41-44).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Dec and Schiefer to include the teachings of Jack because determining the carbon dioxide content of the emission allows the skilled artisan to monitor the environmental pollution (see Jack, column 1 lines 6-9).

#### ***Allowable Subject Matter***

4. Claims 23, 28, 30 and 32 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

#### ***Response to Arguments***

5. Applicant's arguments filed 03 December 2004 have been fully considered but they are not persuasive.

Applicant argues that the combination of Dec and Jack do not teach “a source of electromagnetic radiation that emits electromagnetic radiation in a first wavelength region, a second wavelength region, and a third wavelength region, and a third wavelength region, and that is directed through an exhaust emission plume”; however, Applicant’s arguments are not well taken. Dec teaches directing electromagnetic radiation through an exhaust emission plume (see Dec, column 4 lines 33-38), but does not specify that this light beam has multiple wavelengths. Jack discloses one or more sources which emit electromagnetic radiation in a first wavelength region, a second wavelength region, and a third wavelength region (see Jack et al., column 4 lines 10-17). Jack explains that the electromagnetic radiation emitted has a plurality of predetermined wavelengths (see Jack, Abstract), which are used to identify multiple pollutants found within the exhaust plume (see Jack, column 4 lines 48-64). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Dec to include the teachings of Jack because detection of multiple wavelengths allows the skilled artisan to determine multiple constituents within an emission plume (see Jack, column 4 lines 10-17).

Applicant further argues that there is no motivation to combine Dec and Jack; however, Applicant’s arguments are not well taken. Both Dec and Jack teach directing light beams through emission plumes to detect various properties of the emission, such as the opacity or the constituents of the plume.



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6. Applicant's arguments with respect to claims 26, 27, 29 and 31 have been considered but are moot in view of the new ground(s) of rejection.

Applicant argues that Anderson does not teach "calculating an opacity value proportional to the relation ' $K_s = \ln(1/T)/n$ '". The Examiner concedes that Anderson merely discloses a reference to Beer's Law and does not teach using Beer's Law to calculate the opacity. This limitation is now met by the teachings of Schiefer. Schiefer teaches calculating an opacity value using Beer's Law (see Schiefer, column 7 lines 55-57). Inherently, in using Beer's Law to calculate the opacity, the claimed derivation of Beer's Law is necessarily present.

### ***Conclusion***

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mary Kate B Baran whose telephone number is (571) 272-2211. The examiner can normally be reached on Monday - Friday from 9:00 am to 6:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marc S Hoff can be reached on (571) 272-2216. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

22 December 2004

*Hal Wachsmen*  
**HALWACHSMAN**  
**PRIMARY EXAMINER**  
*Art 2857*